Approved Minutes of IHRA Steering Committee

Thursday, November 12, 1998
Meeting Room B
US Mission
11 Rte de Preqny
1292 Chambesy
Geneva

Attendees:

Australia	John McLucas
Belgium (EC)	Roberto Farravante
Canada	Brian Jonah
France	Jean-Pierre Médevielle
	Dominic Cesari
Germany (EEVC)	Bernd Friedel
Hungary	Sándor Szabó
Italy	Claudio Lomonaco
Japan	Yoshiyuki Mizuno
	Kazuhiko Morishaki
Netherlands	Gerard Meekel
Poland	Wojciech Przybylski
Sweden	Anders Lie
United Kingdom	Peter O'Reilly
United States	Raymond Owings
	John Hinch
	Julie Abraham

Agenda Items:

- Review of May Meeting
- Side Impact
- Working Group Status Reports
- OICA
- IHRA Web Site
- Draft DG Letter
- ESV Draft Proceedings
- Next Meeting

Welcome:

Mr. Owings called the meeting to order at 2pm. He thanked Canada for hosting the ESV -16 and credited them with a great conference. All attendees introduced themselves.

Last Meeting Minutes:

Mr. Hinch reviewed the minutes for the May 98 meeting with the committee. We reviewed the

written comments from Messrs. Médevielle and Lomonaco. Each provided rationale for their comment. It was agreed to add their comment to the minutes.

Additionally, Mr. Friedel requested that we add a sentence to reflect the committee's agreement at the May 98 meeting that NHTSA send a letter to ISO introducing the new IHRA Side Impact Working Group (WG). The committee agreed to add this change to the May minutes.

Side Impact:

Mr. Owings opened the side impact (SI) discussion with a short review of the subject. Mr. McLucas presented the SI-WG status report (Attachment 1). He pointed out that the SI-WG was seeking confirmation or guidance from the steering committee for their side impact research program. (See SI-WG status report, pg.3)

Several of the Steering Committee's members provided inputs during a lively discussion. Mr. Médevielle thought the steering committee did not provide a clear mandate for the SI-WG at the May 98 meeting. Mr. Jonah agreed that the SI-WG needed a clear mandate and possibly the steering committee should provide one. He also thought improving the EUROSID1 should be performed by the Biomechanics (BIO) WG. Additionally, Mr. Jonah indicated Canada would like to use the IHRA SI-WG research to support a new regulation for their country.

On a side point, Mr. Lomonaco indicated the SI-WG should also be looking at the interaction of the child with side impact crashworthiness safety devices. Mr. Lomonaco indicated that the smaller cars in Europe could have more problems with affording side impact protection to its occupants, especially those equipped with side impact air bags. He also pointed out that work on functional equivalence was outside the activities of the IHRA SI-WG (ref. May 98 minutes - page 2-column-1).

Mr. Owings indicated the United States recently completed a series of reviews with automobile manufactures discussing side impact air bags and their interaction with out of position children.

Mr. Owings reviewed the requests made by the steering committee to the BIO-WG. Generally, the BIO-WG was asked to quantify the current state of side impact dummies, impact injuries associated with side impact, analysis of human injuries, and review of all biofidelity tests and crash test results. Mr. Owings reminded the steering committee that BIO-WG was not supposed to work on improving the side impact dummies as part of their work assignment from the steering committee. Mr. Fridel indicated that EUROSID1 was discussed at a recent (about one month prior) EEVC meeting, and they were writing a letter to NHTSA asking NHTSA about problems they had uncovered with EUROSID1.

Mr. Owings said the EEVC letter would require a response from NHTSA, not the IHRA steering committee. He reiterated his belief of what IHRA should focus on the following: IHRA should provide science to support policy, not set policy.

Mr. Jonah expressed his hope that these efforts would be used to support harmonized standards for the world. On this same point, Mr. Owings indicated he felt that Harmonization of research - that is agreeing on the underlying science, will remove most of the obstacles for harmonized

standards.

After a few additional comments, Mr. Owings asked the steering committee to summarize the side impact discussion. Mr. Friedel asked that we develop a proposal to direct the research.

Mr. McLucas agreed to take the lead on developing the steering committee's guidance to the SI-WG. Generally, the steering committee asked: 1) drop the use of "functional equivalence" from any guidance and replace with a performance related phrase, 2) include Japan when conducting tests, not just the trans-Atlantic nations, and 3) include child protection for side impact.

Status Reports:

Status reports were given by the steering committee members from the various countries who have the lead in each working group, as follows:

Mr. Lomonico
Advanced Frontal
(Attachment 2)
Mr. O'Riley
Compatibility
(Attachment 3)
Mr. Jonah
ITS
(Attachment 4)
Mr. Mizuno
Pedestrian
(Attachment 5)

Due to a shortage in time, the Biomechanics Working Group report was not discussed, It is included as Attachment 6.

OICA Letter:

The September 15, 1998 letter from Mr. Y. van der Straaten, OICA, was distributed. It was pointed out that OICA did not provide a member for the ITS-WG to represent the Asia/Pacific area. Mr. Mizuno agreed to look into this omission.

IHRA Web Site:

Mr. Hinch reported on a survey he had taken of WG's needs for a web site. The steering committee was in favor of the proposal. NHTSA will take the lead on this effort, which includes the following:

1) The Website would use the following address: http://www-IHRA.NHTSA.dot.gov

This address is not active at this date.

2) The site would include a main page and 6 working group linked pages.

3) The main page would include information on the IHRA, including introduction of the members of the IHRA steering committee and approved meeting minutes.

4) The working group pages will contain 2 areas;
a) public area
b) private area

Each public area would contain public information, including approved meeting minutes. Each private area would include draft documents for sharing among WG members.

5) All documents which are to be placed on the web site shall be submitted to NHTSA in a .pdf

format. This format is generated with the Adobe Acrobat program. Information on this program can be found on the web at www.adobe.com

6) Files can be transferred to NHTSA using postal mail, e-mail, or using a FTP (file transfer protocol) system.

7) The system should be operational in 4 months, or March 1999.

DG Letters:

There were several comments regarding the draft DG letter. The following changes were suggested:

1) Add DGIII, Industry, to the list of Directorates

2) pg. 1, paragraph1; sentence 1 - Change "shrinking" to "limited"

3) pg. 1, paragraph 2; sentence 3 - delete sentence "Mrs. Viola ..... committee." and replace with "The IHRA steering committee consists of representatives from the European Community, United States of America, Japan, Canada, and Australia (see member list for complete listing of representatives)."

4) pg.2, paragraph 2, sentence 2 - delete "initial" from sentence.

5) pg.2, paragraph 3 (list), line 2 - delete "EV" from name . The new name will be "Italy/EEVC"

6) pg.2, paragraph 3 (list), line 4 - delete "EU" from name. The new name will be "United Kingdom/EEVC"

7) pg. 2, paragraph 3 (list), new line - add a sixth line as follows:

"Side impact Australia created 1998"

8) pg.2, paragraph 4, sentence 1 - change the sentence "Along with the above....United States and Australia." to end as follows: "....which was completed by the United States and Australia."

9) pg.2, paragraph 4, sentence 2 - delete sentence "At the 16th ESV ..... Australia taking the lead."

10) pg.2, paragraph 4, sentence 4 - change the end of sentence " The work under .... of the first meeting." To read ".....of the first meeting (May 1996)."

11) pg. 2, paragraph 5, sentence 4 - change " directorates." to "Directorates."

12) pg. 2, paragraph 5, sentence 4 - change "EEVC" to "European Enhanced Safety of Vehicle Committee"

13) pg.3, line 3 and 4 - delete "Associate Administrator for Research and Development" and "NHTSA"

The United States will make these corrections and fax an edited version to the steering committee members for approval.

ESV Draft Proceedings

Mr. Owings passed out a 2-volume set of binders (one for each member) for the proceedings of the ESV-16. These proceedings were in draft form.

New Business

1) Mr. Owings passed out a SAE paper Mr. Kanianthra authored on the subject of IHRA. Mr. Kanianthra received a "Best Paper" award from SAE for this paper.

2) Mr. Ferravante, DG III of the European Commission, asked that the EC status on the IHRA Steering Committee be changed to "Information Only."

3) The IHRA Steering Committee member list has been updated based on new members, address changes, and phone number changes. It is attached to this report (Attachment 7).

Next Meeting

It was agreed to continue holding IHRA steering committee meetings in conjunction with the WP 29 meetings. It was further agreed, that for the next few meetings, the IHRA steering committee should meet every other WP 29 meeting. Since WP 29 meets every 4 months, the IHRA steering committee would meet every 8 months, with the next meeting being Thursday, June 24, 2 p.m. to 6 p.m. at the US Mission. The IHRA Secretariat should coordinate this with the WP 29. The meeting was adjourned at 6:10 pm.

Prepared by: John Hinch, IHRA Secretariat
Date: Nov 30, 1998
End of Report

Attachments:

1 - Side impact progress report
2 - Advanced offset frontal crash protection progress
3 - Compatibility progress report
4 - ITS progress report
5 - Pedestrian progress report
6 - Biomechanics progress report
7 - Revised IHRA steering committee member list

ATTACHMENT 1

PROGRESS REPORT

INTERNATIONAL HARMONISED RESEARCH ACTIVITIES
SIDE IMPACT WORKING GROUP

NOVEMBER 1998

BACKGROUND

At the international Harmonised Research Activities (IHRA) Steering Committee meeting held prior to the 16th ESV at Windsor, Canada in June 1998, it was agreed that a working group be formed to develop a harmonised side impact test procedure. This test procedure would use the harmonised test dummy being developed by the ISO WorldSID Task Force and coordinated by the IHRA Biomechanics Working Group. (BWG). The members of the Side Impact Working Group are:

Keith Seyer	Federal Office of Road Safety, Australia (Chair)
Craig Newland	Federal Office of Road Safety, Australia (Secretary)
Dainius Dalmotas	Transport Canada
Richard Lowne	EC/EEVC
Joseph Kanianthra	National Highway Traffic Safety Administration, USA
Takahito Uchimura	Japanese Ministry of Transport
Hideki Yonezawa	Japanese Ministry of Transport
Robert Hultman	AAMA
Rainer Justen	ACEA

FIRST MEETING

The Side Impact Working Group (SIWG) held its first meeting on 19 September 1998 in Sweden. Representatives of both industry and government provided information on current activities in the Americas, Europe and the Asia-Pacific. Based on this information, it was agreed that the work program for the Working Group would consider:

- Examining real world crash data to determine the types of side impact and the injuries being sustained. This would facilitate the development of a test procedure and test device for a harmonised side impact regulation.
- The need to consider vehicle-to-vehicle compatibility in development of the test procedure.
- Whether there would be both a short term and long term solution.
- The short term solution to be fixing the problems of EuroSID1and have it accepted as an alternative dummy in other regulations.

- The long term solution to include:
  - WorldSID as the harmonised dummy family
  - Test procedure that accounts for the most common side impact crashes in the real world. Indications are that this would include a mobile deformable barrier test and a narrow fixed object test.
  - Test procedure to provide protection for a range of occupants.
  - Some form of airbag evaluation.
    Consider the most up-to-date injury criteria.

Members agreed to provide available real world crash data to Mr Dalmotas who volunteered to collate the data for both the SIWG and BWG. It was noted that new NHTSA and JAMA studies would be available in 1999

SECOND MEETING

The second meeting was held on 5 November 1998 in Arizona. Updates on the activities of the IHRA BWG and WorldSID Task Force were presented to the meeting. The members presented real world crash data that indicated injuries and fatalities resulting from crashes into narrow objects such as poles and trees made up a large proportion of road trauma from side impact crashes.

There was significant discussion regarding the possibility of improving EuroSID1 to become an interim short term harmonised dummy for both the US and European regulations. NHTSA indicated that it would consider this proposal more positively than the AAMA petition to accept the European regulation as being functionally equivalent to FMVSS 214.

The EC/EEVC indicated that it was prepared to support work to improve EuroSID1 to address problems found in European testing. However, it would only look at resolving the "Flat Topping" issue (a problem not found in European testing) if there was a chance that the improved dummy would be accepted for use in FMVSS 214.

Mr Lowne and Mr Dalmotas explained the rationale behind a draft test matrix to evaluate passenger cars designed exclusively to FMVSS 214 and then tested to the European regulation and vice versa. They undertook to draft the matrix as a result of the 1st meeting to not only assist NHTSA address the AAMA petition on functional equivalence but also to look at vehicle design changes driven by the two regulations. It is hoped that the tests would provide the SIWG with valuable information in developing a harmonised test procedure.

There was further discussion on the issues that needed to be addressed when developing the harmonised test procedure including:

- Mobile trolley test configuration. Crabbed or perpendicular?

- Stiffness of the mobile deformable barrier (MDB) face
- Geometry of the MDB.
- Mass of the trolley. Does it matter?
- Should the MDB be homogeneous or more representative of a vehicle?
- Front dummy only or one in the rear seat as well?
- Both dummies the same size?

It was agreed that members would provide the secretariat with their current experiences regarding the above issues before the end of 1998 together with any suggestions for a test program to address them.

It was noted that Transport Canada and other members who had scheduled testing to examine the functional equivalence of the US and European regulations should continue and provide any data for the SIWG's consideration at the next meeting.

FUTURE MEETINGS

It was agreed to hold the next SIWG meeting back to back with the BWG and WorldSID Task Force meetings scheduled for mid-February 1999. The Chair suggested that these could be held together with the IHRA Pedestrian Working Group meeting in Adelaide scheduled for February 1999. While WorldSID Task Force members were amenable to this suggestion, it was noted that NHTSA members may have funding problems for a meeting in Australia.

It was also agreed that both the BWG and the SIWG would meet on May 10, 11 1999 prior to the WorldSID Task Force meeting in Kyoto, Japan.

STEERING COMMITTEE GUIDANCE

While most SIWG's members agreed that research towards a short term resolution of both the dummy and functional equivalence issues would assist the long term task, the group would like to seek the Steering Committee's confirmation that it should:

1. Work on the short term task to improve EuroSID1 as a short term interim harmonised dummy for both the US and European regulations.
2. Conduct a test program to examine the issue of functional equivalency of the US and European regulations as part of its work program to develop a long term harmonised test procedure.

Keith Seyer
Chair
9 November 1998

ATTACHMENT 2

Ministero dei Trasporti e della Navigazione

DIREZIONE GENERALE DELLA MOTORIZZAZIONE CIVILE E DEI TRASPORTI IN CONCESSIONE

Roma, 23/9/98

TO:
- Dr. Tom Hollowell ++1 202 366 5930
- Dr. Daimius Dalmotas +11 613 998 4831
- Mr Toshimi Yamanoi ++81 462 701 565
- Dr. Kazuo Oki ++81 565 235758
- Mr. Keith Seyer + +61 6274 7477
- Mr. Tadeusz Diupero ++48 22 116028
- Mr Richard Lowne +144 1344 770645
- Mr. Herbert Hennsler ++32 2 2969637
- Mr. John Hinch —+1 202 366 5930
- Mr. Adrian Hobbs ++44 1344 770915
- Mr. George Neat +11 617 4943064
- Mr. Anders Lie +146 24375480
- Paul Fay —+44 1268 703747

IHRA Working Group on Advanced offset frontal crash protection

Please find here enclosed the minutes of the third meeting of the Working Group, held in Rome on 14 - 15th September 98.

Yours sincerely

Claudio Lomonaco

INTERNATIONAL HARMONIZED RESEARCH AGENDA (I.H.R.A.)

Rome, 18/9/98

STATUS REPORT ON THE ADVANCED OFFSET FRONTAL CRASH PROTECTION GROUP
(Based on the results of the meeting held in Rome on 14 - 15th September 1998)

Participants: C. Lomonaco (Chairman, Ministry of Transport of Italy), R. Lowne (EEVC), A. Lie (EEVC), K. Seyer (Federal Office of Road Safety Australia), A. Hobbs (IHRA Compatibility), T. Hollowell (NHTSA), D. Dalmotas (Ministry of Transport of Canada), K.Oki (JAMA), P. Fay (ACEA/OICA), E. Gianotti (Secretary of the group).

INTRODUCTION.

The chairman resumed to the participants the task of the group and with reference to the agenda the scope of the meeting.
The chairman remembered to the group that time is coming to finalize the goal of an harmonized standard on the matter. The rest research are in progress in all the country involved in the IHRA program and each member has taken since the beginning the commitment to develop a specific item. Accordingly each participants has been invited by the chairman to enlighten the group about the state of the art on each own specific research.

Australia introduced a document (released by the secretariat as IHRA AFC-8) to provide an overview on the state of the art on the frontal impact research in the various part of the world.

The delegate from NHTSA anticipated his report in proposing an internet web page on the topic, to allow an exchange of information among the members of the group. The proposal has been accepted by all the members.

DISCUSSION

1) The two steps approach

Since the beginning of the discussion a two step approach to future frontal requirements has been confirmed by the group. Anyway several comments and suggestion about each of this step has been pointed out by the participants

Mr Lowne advocated that EEVC is not a political regulatory body, so in pursuing his research it has been assumed that EEVC might upgrading the frontal impact standard in items concerning dummy (female dummy) and performance criteria.
About the first step, EEVC delegate came up that only one test focused on 5% dummy is limited because it should reduce the safety of other size category of occupants. Namely , the adoption of a fifth percentile dummy in either of the seating positions, in place of the standard fiftieth percentile dummy, would lead to a reduced level of protection in comparison with the current test condition and therefore EEVC would not be in favor of considering this.

At this aim Mr. Lowne released the report on EEVC Activities in Support of IHRA Tasks, that was numbered as IHRA AFC 9.
Anyway two tests rise different questions. because all crash test approval have just one test in Europe. So the question was about the advantages of a two tests approval in Europe

More concerned about the relevant safety issue in north America of this recent spell. namely the air-bag casualties, Mr. Dalmotas said that 5th % female are in most cases killed by air-bag. So he argued that focus on 5th% is a safety improvement for cars.

The delegate from Australia put forward the use of a smart air-bag in order to reduce the risk of an air-bag. Anyway the proposal seemed controversial to the group and the OICA delegate argued that it is difficult to combine into a legislation requirements concerning the deployment, the seat position, the occupant size the effect of the tension limiter, pre-loader and out of position

Mr. Hobbs continued the discussion asking to the group which kind of dummy should be part of the two test in order to minimize the risk of an air-bag. Such a task is not easy to cope with. The European legislation implies the use of belts, but there are specific reality were belts are disregarded by users

Also Australia raised the same problem for taxi driver, who are not required to wear belts in the state of New South Wales. There has been a case of an unrestrained taxi driver suffering severe neck injuries in a crash when the airbag deployed. The restrained passenger was uninjuried.

NHTSA enlighten to the group the way which more likely intends to pursue for the first phase:
A sure first test with a 5th % female dummy with a test speed of 40 km/h and a likely second test using a 95th% male dummy at 60km/h to cover the risk of Air-Bag.

EEVC advocated that the EEVC and US approach is not contradictory, both are going through the 1st step.
Anyway a first step with two tests will imply difficulties in Europe due to type approval. EEVC confirmed his reserve about the two tests

Serious concerns were raised also by the OICA delegate about which 2nd test to consider more appropriate.

After confirmed the two steps approach the chairman went ahead into the discussion, asking about the outcomes of the researches led by the members.
Furthermore the previous table with the topics of interests was implemented with new commitments:

WORKING MATTERS	USA	CAN	EEVC	J	AUS
Trolley	X		X		
Type of barriers	X	X	X	X	X
-stiff	x	x	X		x
-deformable	x	x	X		x
Impact angle	X		X		
Dummy	X	X	X		X
5%ile female					
95%ile male					
Impact speed	X	X	X	X	X
Performance criteria	X	X	X	X	X
-footwell intrusion	x		X		x
-steering wheel intrusion	x		X		
-abdomen injury detection	x	x			
-arm injury	x	x			
Air-Bag performance	X	X			X
-Deployment time & effects		x			
Extension to vehicle of category N1.			X		

2) Working matters

a) Trolley (2nd step):
No relevant results are coming out about this issue from US research. Anyway in the group of compatibility a new side barrier is in progress to take into account the change of the vehicle fleet in US. The trend due to the increases of LTV, SUV, VANS is passed from 15% to 30% today and a 50% is expected for the next future in the market.
The risk of injury is 3-4 time in side impact when a light truck is involved. For the same reason the structure of the frontal impact test trolley has been reconsidered. The expert from Canada expressed same consideration.

b) Type of barriers (1st - 2nd step):
The expert from US remarked that a different bumper, mass and size will be devised to match the vehicle fleet. Anyway for the first step the European barrier should be adopted by US as well.

Mr Lowne introduced document IHRA-AFC 9A in which the main characteristics of fixed and mobile barrier are compared. The test, and the barrier as well, should be representative of all kind of accidents

The representative of EEVC, with reference to document IHRA-AFC-16, remarked that the barrier must not represents all kind of cars but it might concern the most prominent characteristic of vehicle front faces and the way in which it will influence the future cars.

b) Impact angle (2nd step):
The discussion has been controversial and conclusion are still far to be finalized. It is still premature to give any definition before to start with a deep assessment of car to car tests. At this aim a tide connection to the IHRA Compatibility group was recommended
NHTSA studied extensively and categorized each test procedure with respect to its crash pulse and expected intrusion level. Findings of the analysis of each of the candidate test procedures with respect to their lead time, target populations, body regions addressed, and effect on compatibility has been report in the first part of the document from NHTSA numbered IHRA AFC-13.
The agency concluded that the continued use of the existing fixed barrier test in both the perpendicular mode and angles from 0 to 30 degrees remains most appropriate within the time-frame of the advanced air-bag regulatory actions.

c) Impact speed (1st - 2nd step):
Based on real crash data NHTSA endorsed a velocity of 60 km/h for the first step. A second step velocity of 70 mph (112km/h) for the mobile barrier will be likely.

Canada advocated the same speed for the first step test but has not yet findings for the future second step.

Australia supported a move to increasing the impact test speed of ECE R 94/01 to 60 km/h.

EEVC underlined that higher speed increase stiffens and length of vehicles. As aftermath this increases the severity of low injury criteria in collision between stiffer and bigger cars against smaller cars.

Japan pointed out that decision on test speed depends on weight of vehicles. This have to encompass real travel speed and a representative vehicle curb weight. In support of this view document number IHRA-AFC-15 was released.
Mr. Oki concluded that the deformation and the injury criteria data of Car-to-Car crash test can be reproduced by the ODB test. To accurately reproduce the deformation and the injury criteria of Car to Car crash test for vehicles smaller or larger from each other, the collision speed of the ODB test must be adjusted.

d) Performance criteria (1st - 2nd step):
NHTSA in this last spell is concerned about the risk of Air-Bag. The proposals of revised criteria focused on statistical measures, have been presented by the Agency in document IHRA-AFC 14. The report is a keen analysis of biomechanical data to define mathematical relationship that can discriminate the mechanical impact conditions under which various portions of the human body will or will not be injured.
Hollowell reported also an increased interest in developing the instrument lower part of the arm (ulna and radio fractures) to consider the effect of deploying air-bag as well. Even though the agency is interested in enhancing lower extremities for the dummy, no recommendation on this matter is included in the report.

Canada confirmed analogous commitment in their researches taking special regards to portions of human body involved in the air-bag deployment area (such as the lower arm part).

Mr. Hobbs said that it is about to define a geometric criterion for pedal intrusion. The criterion will allow the measure of initial and final position of the pedal and it will be adopted in N-CAP tests

Mr. Seyer said that Australia supported some criteria, either geometric or injury based, for pedal intrusion

e) Air-Bag performance (1st - 2nd step).
Canada stated that the revision of the standard is going toward a depowered Air-Bag with a first step concerning the 5th % dummy with a speed of 40km/h.
The most relevant comments were said in the previous discussion concerning the other topics.

f) Extension to vehicle of category N1 (1st step)
Mr. Lowne introduced the topic saying that two sub-group of vehicle of category N1 can be identified:

- Derived vehicles from category M1
- N1 specifically designed for transport of goods.

The first it is difficult to be restricted as a subgroup. On the second subgroup investigations are in progress to define the proper crash mode to test them. Namely N1 vs. N1 and N1 vs. M1. As a consequence a matching barrier structure is difficult to be redefined properly. Override is another problem introduced in extending the tests to N1 category
Mr. Lowne suggested to ask to the compatibility group to give support to categorize N1 vehicles.

Conclusion
The chairman suggested to introduce tests only for vehicles derived by M1. In any case OICA was invited to collect data available overall the world to define N1 subgroups and at the same time the IHRA compatibility group secretariat will involve his group in this issue.

3) Comparative analyses method.

The discussion got through amending the former table 2 concerning the Trolley-based Frontal Offset Impact Test procedure.

ADVANTAGES	ALTERNATIVE APPROACH TO ACHIEVE SAME ADVANTAGE WITH FIXED BARRIER
1. The acceleration pulse. DV and energy distribution is representative of real world serious injuries	No known alternative.
2. Takes into account the effects of the Mass Ratio of the	Change impact speed with vehicle mass
3. Can include angular effects on the deformation and intrusion characteristics	No known alternative.
4. Can include a possible measure of Compatibility (by, for instance, measuring the vehicle and/or trolley acceleration).	Measure the force on the fixed barrier behind the deformable face.
Disadvantages	**POSSIBLE ACTIONS TO REDUCE THE DISADVANTAGE**
1. Complex test procedure for "moving barrier-moving car" (High speed trolley vibrations). Possible overriding	Reduce complexity by testing co-linearly and/or using moving barrier to stationary car. Reduce the possibility of overriding.
2. Repeatability of more complex test may be poor (for angled moving barrier-moving car)	
3. Difficulties to videorecord impact effects between trolley and car	Videorecord impact effects between mobile trolley and car. Reduce the possibility of overriding.
4. Limited number of test laboratories with capability to perform trolley - to -vehicle testing	It depends by the complexity of the test and by the accuracy that the experts want achieve
5. Unknown ground and other interaction effects, especially if one vehicle stationary while the other travels at higher speed - to represent both vehicles moving.	Investigate
6. Need to agree on a harmonized barrier mass when vehicle fleet differs internationally.	Agree to differ

CONCLUSIONS

The chairman asked to the participants to examine all the documents distributed during the meeting in order to define the focal points and goals for the next session. Particular regards shall be given to 9A, which give an overview of the relative merits of having a fixed or variable mass trolley.

It was agreed that the next meeting will be held tentatively in the third week of February 1999. A second option could chosen in may in USA.

LIST OF PARTECIPANTS AT THE THIRD MEETING OF IHRA WORKING GROUP ON ADVANCED OFFSET FRONTAL CRASH PROTECTION

"DATE": 14 -15 September 1998

Place: Ministero dei Trasporti e della Navigazione – Direzione Generale della Motorizzazione Civile – Via Giuseppe Caraci 36 – Roma (Italia)
Pages:

COUNTRY (For Governmental Representatives only)	*ORGANIZATION (For Non – Governmental Representatives only)*	*NAME*	*POSITION*	*ADDRESS*	*PHONE No. FAX No*	*SIGNATURE*
FEDERAL OFFICE OF ROAD SAFETY AUSTRALIA		KEITH SEYER	CHIEF ENGINEER VEHICLE STANDARDS RESEARCH + DEVELOPMENT	GPO BOX 594 (15 HORT STREET) CANBERRA A.C.T. 2601 AUSTRALIA	+61 2 62747479 (tel) +61 2 62747477 (fax)	ksceyer@email.dot.gov.au
UK	TRL	ADRIAN HOBBS	HEAD OF CRASHWORTHINESS	OLD WOKINGHAM ROAD CROWTHORNE BERKSHIRE ENGLAND RG45 6AU	+44 1344 770415 +44 1344 770915	ADRIANH@VE.TRL.CO.UK
USA	NHTSA	TOM HOLLOWELL	Chief, Crashworthiness Research Division	NHTSA, NRD-11 400 Seventh St. SW Washington, DC 20590 USA	1-202-366-4726 (ph) thollowell@nhtsa.dot.gov 1-202-366-5930 (fax)	
EC / EEVC	EEVC	RICHARD LOWNE	HEAD OF BIOMECHANICS AND OCCUPANT PROTECTION	TRL OLD WOKINGHAM RD CROWTHORNE BERKS ENGLAND, RG45 6AU	TEL: +441344770617 FAX: +441344770645 rlowne@ve.trl.co.uk	

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COUNTRY (For Governmental epresentatives only)	*ORGANIZATION (For Non – Governmental Representatives only)*	*NAME*	*POSITION*	*ADDRESS*	*PHONE No. FAX No*	*SIGNATURE*
					dalmotd.tc.gc.ca	
CANADA		DALIUS DALMOTAS	CHIEF, CRASHWORTHINESS RESEARCH	330 SPARKS TOWER "C" 8th FLOOR, OTTAWA ONTARIO CANADA K1A	(613) 998-1988 613 990-2913 ONT K1A ORS	
EC/ FEUC		ANDERS LIE	EXPERT TRAFFIC SAFETY	SWEDISH NATIONAL ROAD ADMIN. S-78187 BORLÄNGE SWEDEN ANDERS.LIE@VV.SE	TEL +46 243 75017 FAX +46 243 75480	
JAPAN	JAMA	KAZUO OKI	Manger	Otemachi Bldg. 1-6-1 Otemachi Chiyoda-ku, Tokyo JAPAN	Phon +81-565-23-7648 Fax +81-565-23-5758 Email oki@h01089.dg.toyota.co.jp	K. Oki
ITALIA	MIN TRASP	Biandrà Loredana				

LIST OF PARTECIPANTS AT THE THIRD MEETING OF IHRA WORKING GROUP ON ADVANCED OFFSET FRONTAL CRASH PROTECTION

"DATE": 14 – 15 September 1998

Place: Ministero dei Trasporti e della Navigazione – Direzione Generale della Motorizzazione Civile – Via Giuseppe Caraci 36 – Roma (Italia)
Pages:

COUNTRY (For Governmental Representatives only)	*ORGANIZATION (For Non – Governmental Representatives only)*	*NAME*	*POSITION*	*ADDRESS*	*PHONE No. FAX No*	*SIGNATURE*
	FORD (ACEA/JAMA)	PAUL FAY	TECHNICAL SPECIALIST AUTOMOTIVE SAFETY OFFICE FORD MOTOR CO LTD	ROOM 40/485 TRAFFORD HOUSE STATION WAY BASILDON ESSEX SS16 5NX UK	+44-1268-702671 +44-1268-703747 (FAX) PFAY@FORD.COM	Paul A Fay
MINISTRY OF TRANSPORT OF ITALY		EDOARDO GIAHOTTI	EXPERT OF MINISTRY OF TRANSPORT OF ITALY	C.so De NICOLA No. 10 TURIN ITALY	[redacted] +39 11 3198279 ++39 11 683 818 (FAX) e-mail: giahotti@invete.it	

LIST OF CLASSIFIED DOCUMENTS

- IHRA/AFC-8-Frontal impact research (K. Seyer).
- IHRA/AFC-9-Report on EEVC Activities in Support of IHRA Tasks (R. Lowne)
- IIRA/AFC-9a-Trolley Mass for a Mobile Barrier - Car Frontal Offset Impact Test (R. Lowne).
- IHRA/AFC-9b-Requirements for Selecting a Frontal Impact Deformable Barrier Face (C.A.Hobbs)
- IHRA/AFC-10-Determination of Frontal Offset Test Conditions based on crash data (S. Stucki, W.T.Hollowell)
- IIRA/AFC-11- Frontal Offset Crash Test study using 50th percentile male and 5th percentile female dummies (B.T.Park. R.M.Morgan, J.R.Hackney, J. Lee, S. Stucki, J. Lowrie).
- IIRA/AFC-11 A (B.T.Park, R.M.Morgan, J.R.Hackney, J. Lee, S. Stucki, J. Lowrie).
- IHRA/AFC-12- Offset test procedure development and comparison (C. L. Ragland)
- IHRA/AFC-13- Review of Potential Test Procedures for FMVSS No.208 (S. Stucki, W.T.Hollowell, H.C.Gabler, S. Summers, J. R. Hackney)
- Development of Improved Injury Criteria for the Assessment of Advanced Automotive Restraint Systems (M. Kleinberger, E.Sun, R. Eppinger, S. Kuppa, R. Saul).
- IHRA/AFC-15-Real Conditions of Japanese Road Traffic and Traffic Accident (K. Oki).

ATTACHMENT 3

06/11/98

INTERNATIONAL HARMONISATION OF RESEARCH ACTIVITIES - COMPATIBILITY WORKING GROUP

Chairman's Status Report for IHRA Steering Committee on 12 November 1998

Nominations and Attendance

Since the last report, three industry delegates from USA, Japan and Europe were nominated by OICA. Two attended the fourth meeting in October 1998, the existing delegate from Japan having included the OICA role as part of his wider representation of Japanese interests. The third industry representative, from the US, intends to attend future sessions.

Delegates from Australia and Poland have not yet attended any meetings. Canada attended the first and fourth WG meetings.

The third and fourth meetings of the compatibility working group were held at INSA on 21-22 January 1998 and Turin on 13 - 14 October 1998. These were linked to the EEVC WG15 meetings on compatibility with common sessions of technical presentations.

In addition a report was made to the 16th ESV conference by the then chairman Mr Rodgers. Since then Mr O Reilly (also of the UK Department of Transport Environment and the Regions) has replaced Mr Rodgers.

Co-operation with EEVC WG15

The longer established EEVC WG 15 was formed in February 1996. Representatives from NHTSA and industry attend WG 15 and the chairman of the IHRA compatibility group has also attended recent EEVC meetings.

For a trial period, the EEVC agreed that IHRA compatibility meetings can be held adjacent to WG15 meetings with a common session for technical presentations. This has proved very valuable in promoting awareness as well as offering savings in travel and avoids the need for some delegates to duplicate presentations.

This format could also be used if the IHRA compatibility meeting were to be held in the US. There has already been an informal meeting of WG 15 and the US MVSRAC Vehicle Aggressivity and Compatibility WG in Washington, after the ESV conference.

So far, all the meetings have been linked to the EEVC in Europe but the chairman is to explore the possibility of linking the next (fifth) meeting to the IHRA frontal impact group. The sixth meeting could be held at the time of the Stapp conference

Other European links

Dr Zobel (OICA) who joined the group at the fourth meeting also leads the Brite Euram (industry) project on compatibility.

A separate report (Investigation of the Test Speed, Compatibility and Aggressivity of Cars) involving ADAC, AIT and FIA groupings and partly funded by DG 7 of the European Commission was circulated direct to members of the IHRA compatibility WG by the FIA.

Member's Positions

The USA continues to have the most extensive plans for compatibility research. The approach taken is based on studying accident statistics to determine the extent of incompatibility in the US vehicle fleet, using computer modelling techniques to characterise and represent the demographics of the fleet, the pattern of accidents and to investigate the areas where changes to test procedures could have the best effect on casualty rates. There is particular concern in the US about the high incidence of light trucks and vans (LTVs) and their incompatibility with conventional cars FE models of typical vehicles including LTVs have been developed (These are available to the EEVC.) At the last meeting NHTSA presented some results of its side impact tests with sports utility vehicles (SUVs) and angled frontal impact tests carried out at 35 mph and 30 degrees.

The EEVC WG 15 work is partly funded by the European Commission, the Commission project lasting from July 1997 for 2 years followed by a reporting phase. Many groups are involved in the work and only those responsible for the individual packages are indicated. The work to date includes a literature review (SWOV), accident analysis (INRETS) to investigate European accidents both drawing on in-depth studies and general accident data to try to quantify the incompatibility problems. This is interlinked with a structural survey (INSIA) to create a data base of the geometrical properties of new car models on the European market. The modelling work (TNO) includes the use of Madymo models developed from FE models provided by NHTSA. The programme is now close to decisions on the content of the vehicle crash testing phase (TRL) although there has been a UK research programme, including crash testing, which has reported to the EEVC group. Given the overall complexity of the task, it is too early to indicate whether firm conclusions can soon be drawn on the way forward on compatibility. Effects being examined include structural interaction, mass ratio and frontal stiffness.

The initial part of the Brite Euram project is concentrating on accident studies which are currently proving to be inconclusive; crash testing will follow. The programme includes modelling.

At the last meeting, Japan presented data on the Japanese fleet and overall accident statistics which were analysed by types of vehicle and accident. Fatal and serious (belted) driver casualties were examined in more detail. Car to car and car to barrier tests had been carried out with 3 cars in the 1060 kg to 1620 Kg range. Hypothetical savings in casualties were also estimated if smaller cars were to offer the same protection as a car of average weight.

Canada has reported that LTVs were a growing part of the Canadian fleet. Detailed accident analysis will be possible as vehicle identification data (VIN) becomes accessible in their national data set. No tests have been currently planned to address compatibility directly but some of its planned programme of side impact tests may provide useful information.

Prospects for Harmonisation

It was always envisaged that the working group would look initially at the effects of compatibility in the car field, but always making sure that any conclusions took account of the effects on other types of vehicle. However there is a clear difference in the mixture of vehicle types in use in North America compared with Europe and Japan. There may also be differences when Australia is studied more fully. In particular, the high incidence of LTVs in the US and Canada has relevance to compatibility. This variation in car fleets has required the IHRA group to consider a wider group of vehicles than was originally planned in the EEVC WG 15 work for Europe.

Some of the FE car models created by NHTSA relate to cars on sale in Europe and this is of use to the EEVC modelling work led by TNO.

Representatives have been encouraged to think about the shape of possible testing methods so that this can help shape views on current efforts and plans, while much of the research work is in the earlier stages.

Conclusion

Progress has been made on the early stages and the range of modelling and crash testing results available should widen considerably during 1999.

Finding common methods to evaluate and control compatibility which could confidently deliver quantifiable casualty reductions in different continents remains a complex task. Much remains to be done and it is not likely that a definitive solution is achievable around 2000. But is possible that a worthwhile interim method may be identified.

IHRA COMPATIBILITY WORKING GROUP MEMBERS

(last update 14 October 1998)

Note. Not all members attend the meetings.

Mr Keith Seyer (Australia)
Federal Office of Road Safety

Mr Dainius Dalmotas (Canada)
or Deborah Collard
Transport Canada

Dr Tom Hollowell (USA)
NHTSA

Mr George Neal
Volpe Center (USA)

Mr E Faerber (EEVC)
BASt

Dr D Cesari (EEVC)
INRETS

Prof. Adrian Hobbs (UK - Secretary)
Transport Research Laboratory

Mr Peter O Reilly (UK - Chairman)
DETR

Mr Kazuo Oki (Japan)
represents OICA, JAMA, Ministry of Transport

Mr Yoshiharu Kadotani
JAMA (Japan)

Mr Koji Mizuno (Japan)
Ministry of Transport

Dr R Zobel OICA
Volkswagon AG

Dr Priya Prasad OICA
Ford USA

Dr Jerzy Wicher (Poland)
Institute of Vehicles
Warsaw University of Technology

ATTACHMENT 4

International Harmonized Research Activities - Intelligent Transport Systems
Progress Report November 9, 1998

1. **IHRA-ITS Status report**

The status report presented at ESV was revised to reflect further discussions held during the WG meeting on June 3, 1998. Specifically, definitions were included for usability, workload, direct safety and behavioural adaptation. The report clarifies that the WG is concerned with broad issues surrounding human-machine interaction, not limited to classic human-machine interface issues.

The feasibility of developing procedures that address cross-cutting issues was discussed. It was agreed that while this is the initial intention, the need to categorize applications (e.g., rear end collision avoidance, road departure collision avoidance, lane change and merge collision avoidance, intersection collision avoidance, railroad crossing collision avoidance, vision enhancement, location-specific alert and warning, navigation/routing, real time traffic and traveler information, driver comfort and convenience, vehicle stability warning and assistance, driver condition warning, obstacle/pedestrian detection, low friction warning and control assist, longitudinal control, lateral control) may become more apparent as the work progresses. Therefore, an attempt will be made to generalize and integrate procedures developed for specific research applications in the development of the overall framework.

2. **Expert Opinion Survey**

It was decided to distribute an expert opinion questionnaire in order to help identify research needed to elaborate the ITS Test and Evaluation framework (see Status Report) that could be supported by the WG. Accordingly, a questionnaire was drafted and distributed to 65 research institutions worldwide with a response deadline of September.

While the questionnaire made it clear that it did not constitute a bidding process, a decision about how proposed research will be funded will have to be addressed at the next WG meeting in February. A major concern for this WG is that no funds have been allocated to collaborative research in support of IHRA-ITS efforts. However, some members indicated it may be possible to include IHRA-relevant research in future plans.

Nine responses were received (from Battelle Seattle Research Center, Technische Uni München, SWOV Institute for Road Safety Research, Universität Regensburg, Transport Research Laboratory, Flight Research Calspan SRL Corporation, Diagnose and Transfer, Institut für Kraftfahrwesen, and California PATH).

3. **Workshop:**

The responses to the Expert Opinion Questionnaire will be evaluated by a task group in November, 1998. Organizations that have responded will be invited to present their proposal to a workshop that will be held in February 1999, perhaps in conjunction with SAE, and to discuss potential collaborative opportunities.

A Working Group meeting will be held following the workshop to consider a longer-term research plan.

4. **Long-Term Workplan**

This working Group is having difficulty developing a longer term workplan for a variety of reasons, including; lack of pre-existing research in the area and the fact that this is not identified in research plans, members of WG have limited discretion over research resources, European research is coordinated by EC, lack of technical expertise within the group. As a consequence, the WG has decided to encourage collaboration among research institutions in areas of relevance to WG mandate. This was the motivation for embarking on the expert survey and workshop. It is anticipated that an overall plan will emerge following discussions at the workshop.

However, as indicated above, a major issue to be resolved concerns research funding. One approach is to consider the various proposals and select those that have merit and fit within the objectives of the WG. It would then be up to the country from which the successful proposals have originated to determine how they could support/fund the work as their contribution to the IIRA effort.

Nevertheless, the WG has produced useful results. For example, a research database was produced, one workshop was held in 1997 and several papers from this workshop will be published, bilateral collaboration between CAMP and VTI is being explored, comparative analysis of codes of practice was completed, and related research findings and priorities have been exchanged.

5. **Other Issues**

Lack of liaison with European Commission appears to be an impediment to international collaboration in research, as discussed at ESV. This is particularly problematic for the ITS WG since most European ITS-related research is funded by the EC. It was decided to write a letter to outline the problem and invite the EC to explore how collaboration on priority research topics can be facilitated. The letter should seek to clarify which are the main groups defining the research program in related areas, what mechanisms exist for cooperation, how results can be shared, which institutes or investigation centres are involved, etc. This task was assigned to the UK member and is still under preparation.

ATTACHMENT 5

ESV/IHRA PROJECT

PEDESTRIAN SAFETY

Status Report

MINISTRY OF TRANSPORT, JAPAN

November 12, 1998

[Introduction]

This report describes the activities concerning IHRA/Pedestrian Safety that have been conducted after the report was submitted to the IHRA Steering Committee in June, 1998.

[Report on Activities]

The third Pedestrian Safety Experts meeting was held at the meeting room of European Commission DG III September, 9 through 11 of 1998. At the meeting, the information was exchanged and studies were made on specific testing methods.

1, Situation of Regulations

As for EU, the draft Regulation for Pedestrian Safety is currently under study by the EEVC/WG17. It is scheduled that the said finalized draft be submitted to DG III by the end of December. Inasmuch as this draft concerns the important subject of safety, DG III is slated to submit this draft to the Counselor as well as to the EU Parliament so that the so-called co-decision may be achieved. If the both parties agree to approve the draft, it will be enacted as a regulation. Conversely, if they fail to reach an accord, they must resort to an arbitrary work, requiring a lengthy period of time.

2, Main Items for Which Decisions were Made after Deliberations at the Third Exports Meeting

a) Accident investigation report by each individual country

We received the accident investigation data from Europe, the U.S., Australia and Japan, although they are not complete. Hence, based on the data, we have decided the final pedestrian's important study regions and their priority.

Adults: First - Head,

Second - Knee & Tibia,

Third - Chest, Abdomen and Pelvis

Children: First - Head,

Second - ? Chest, Abdomen and Pelvis
(The portion at the question mark ? calls for further investigation.)

This will achieve nearly a global unification.

b) Applicable vehicle category (Passenger cars)

As for the applicable vehicle category, we selected passenger cars with a riding capacity of 9 persons or less and with a GVW of 2,500 kg or less. However, in view of the

current status that pick-up trucks are being used as passenger cars in the U.S., etc., we believe that it is necessary to review the accident analysis in the U.S. and restudy it, as required.

c) Development procedure for test method

First, the matrix is prepared in which the priority of first Test tool, second Test procedure and third Acceptance levels (Criteria, threshold) is posted for the body region of pedestrian above so that the studies may be finalized. Furthermore, the test method includes the scope to be covered and requirements.

d) Basic approach to test method development

Our task assigned by IHRA Steering Committee is to develop a harmonized test method aiming at reducing injuries to pedestrians given by passenger cars, while reflecting latest accident situations. However, if excessive emphasis should be placed on the current accident situation, there would be the possibility of being unable to adapt future changes in the vehicle shape, etc. In view of this, it has been proposed that we should make the test method which will be able to cover a wider scope.

Hence, we would like to consider use of a computer simulation so as to cover a wider scope.

e) Future proceeding

The NHTSA proposed that not only information for general public, but also information for members, such as the reports of the Steering Committee, roster of the members, meeting minutes, technical reports from the members, and future meeting information will be posted on the NHTSA's web site, so that the members can freely access such information and use it for their business progress. As the first specific step, it was decided to post the member list and meeting minutes.

Furthermore, it is believed that holding the Experts Meeting twice a year is not enough if we are to make a certain final proposal in 2001. Therefore, we have decided to use the e-mail and web site to provide information between meetings and make deliberations.

In order that each expert can bear part of the task and carry it out toward finalization of the proposal, the chairman proposed an action list for items that are believed to be studied in the future, and this action list was studied. It was decided that all experts cooperatively review this list within a few months and finalize it, including the task for each one. After that, the task will be advanced based on this list.

f) Tasks

A lot of homework have been given to each expert. Their

explanation is omitted here.

g) Schedule of future Experts Meetings

Fourth Experts Meeting: February to March 1999 in Australia

Fifth Experts Meeting: Autumn 1999 in Japan

[Items Needing Attention in the Future]

From now on, the specific test methods will be developed in accordance with the test procedure. Principal existing test methods are those studied in the ISO test method or EEVC/WG17. Based on these methods, deliberations will be further made as to the possibility of use of these methods, the necessity of improvement and development, the utilization of computer simulation, etc.

Development of pedestrian dummies by some manufacturers will call for disclosure of the pedestrian dummy information. Moreover, it is expected that the need of a whole-body dummy will be studied again.

ATTACHMENT 6

PROGRESS REPORT

OF THE

INTERNATIONAL HARMONIZED RESEARCH ACTIVITIES' BIOMECHANICS WORKING GROUP

OCTOBER 1998

Summary:

The International Harmonized Research Activities' Biomechanics Working Group held it most recent meeting in Gothenberg, Sweden, on September 18, 1998, in conjunction with the annual IRCOBI Conference. The attendees were:

Rolf Eppinger	NHTSA, USA (Chair)
Dainius Dalmotas	Transport Canada, Canada
Dominic Cesari	EEVC, Europe
Koshiro Ono	JARI, Japan
Keith Seyer	FORS, Australia
Jac Wismans	EEVC, Europe
Koji Misuna	JMOT, Japan (Observer)

The primary focus of the meeting was to discuss and assign action tasks to the various members to address the recent side impact dummy directive the Group received from the Steering Committee during the recent ESV Conference. Various individuals undertook specific tasks to coordinate the Group's activities in specific technical areas with agreed to completion dates.

A more general discussion ensued after the Group dealt with Side Impact issues and assignments concerning the harmonization of the broader range of biomechanical research. Various areas of research were identified but specific tasks were not developed. It would appear that a consensus of ongoing research being conducted by the various participating countries is necessary to identify those areas where

harmonization has potential. This topic will be discussed further at the Group's next meeting planned for November 4, 1998, following the Stapp Car Crash Conference.

Specific Assignments:

The various specific tasks of the recent Side Impact Directive were discussed and the following action item assignments were made.

- Mr. Dalmotas agreed to assemble and draft the group's consensus opinion with regard to our first task; *Analyze the safety problem in side crashes and quantify the fatalities and injuries to different body regions in real-world side crashes, prioritizing the current problem.* It was agreed that each member would send him data characterizing their region's side crash safety problem and Mr. Dalmotas would merge this into a single coherent document. He proposed to provide a preliminary version of this summary report by November 1998 for the group's review. Everyone is to review it and provide comments to him so that a final draft could be prepared by March 1999.

- Dr. Cesari agreed to be the focal point for the group's second task; *Analyze the human injury data obtained through biomechanics research, impact injury research and testing, Crash Injury Research and Engineering Network (CIREN) data, and other data to determine the injury mechanism(s) in side crashes and establish injury risk functions and develop all meaningful injury criteria to address the safety problem identified in Task 1.* Group members are to send him any new or existing injury criteria, along with data and discussion supporting them, for each of the body regions they have identified as critical under Task 1. He would then merge this information into a draft consensus position paper. Since this may be a somewhat contentious area, group members are requested to develop and deliver their preferred criteria to him as soon as possible.

- Dr. Eppinger agreed to be the focal point for the third task; *Review all availabel biofidelity test results according to their relevance to real-world, in-vehicle environment and establish their validity.* He suggested that the ISO Draft Technical Report ISO/DTR 9790 should be the staring point for this task. He requested that each member review this document and provide him with those response requirements that they deem necessary and sufficient to appropriately characterize the response of a side dummy. He particularly urged that everyone prioritize their response requirements and that the total

number of requirements be reduced from that of the ISO document (Hopefully we can specify pelvic response with something less than ISO's 13 tests!). Initial comments are due to him by early November.

- Dr. Wismans agreed to consolidate the Group's efforts relative to the fourth task: *Examine all available side impact ATDs with regard to their biofidelity and injury risk assessment capabilities for the criteria developed in Task 2.* It was requested that each member send him an inventory of relevant available dummy test data by early November so that he could determine which of the data he would use.

- The group as a whole agreed to each review and critique the proposed ISO prioritization scheme for desired dummy responses and propose any additions, deletions, or changes they felt justified.

New Business

The chair was formally notified by Mr. Y. van der Stratten, Technical Manager at OICA that Mr. Yoshihisa Kanno of Toyota, Mr. Farid Bendjellal of Renault, and Dr. Harold Mertz of General Motors have been named as their industrial representatives to the Biomechanics Working Group. These individuals have been notified by the Chair of their membership and invited to the November 4 meeting of the Working Group.

Next Meeting

The Group has agreed to meet from 1 to 5 pm on November 4, 1998, following the Staff Car Crash Conference at the Buttes Conference Resort in Tempe, Arizona.